

CLAIMS

1. Cured epoxy resin with increased flexural impact strength and breaking extension coupled with retention of stiffness, comprising deagglomerated barium sulphate having an average primary particle size of  $< 0.5 \mu\text{m}$ , preferably  
5  $< 0.1 \mu\text{m}$ , in particular  $< 0.08 \mu\text{m}$ , very particularly  $0.05 \mu\text{m}$ , the barium sulphate comprising a crystallization inhibitor and a dispersant.
2. Cured epoxy resin according to Claim 1, characterized in that the barium sulphate is present in an amount of 0.1% to 50% by weight.
3. Cured epoxy resin according to Claim 1 or 2, characterized in that the  
10 primary particle size of the barium sulphate is in the range from  $0.01 \mu\text{m}$  to  $0.5 \mu\text{m}$ , in particular in the range  $0.01 \mu\text{m}$  to  $0.1 \mu\text{m}$ , very particularly in the range from  $0.01$  to  $0.05 \mu\text{m}$ .
4. Cured epoxy resin according to Claim 1, characterized in that 90% of the secondary barium sulphate particles are smaller than  $2 \mu\text{m}$ , preferably  $< 250 \text{ nm}$ ,  
15 in particular  $< 200 \text{ nm}$ , with particular preference  $< 130 \text{ nm}$ , with particular preference  $< 100 \text{ nm}$ .
5. Cured epoxy resin according to Claim 1, obtainable by dispersing the deagglomerated barium sulphate in a precursor of the epoxy resin prior to its curing, preferably in the hardener, polyol and/or in the uncured epoxy resin.
- 20 6. Cured epoxy resin according to Claim 5, obtainable by using hardeners based on polyoxyalkylenamines or anhydride hardeners.
7. Cured epoxy resin according to Claim 5, characterized in that barium sulphate is used which comprises a dispersant that sterically prevents reagglomeration of the barium sulphate particles and that contains groups which  
25 are able to interact with the surface of the barium sulphate, preferably carboxylate, phosphate, phosphonate, bisphosphonate, sulphate or sulphonate groups, the dispersant being substituted by polar groups which endow the barium sulphate particles with a hydrophilicized surface, preferably hydroxyl groups or amino groups, which permit the coupling of the barium sulphate particles to or  
30 into the epoxide and, accompanying the coupling, a further deagglomeration.

8. Cured epoxy resin according to Claim 7, characterized in that the dispersant is a polyether carboxylate which is substituted by terminal hydroxyl groups on the ether groups.

5 9. Cured epoxy resin according to Claim 1, characterized in that the crystallization inhibitor is citric acid or sodium polyacrylate.

10. Composite material comprising epoxy resin according to any one of Claims 1 to 9.

11. Composite material according to Claim 10, characterized in that it comprises carbon fibre or glass fibre reinforcement.

10 12. Composition comprising epoxy resin precursor, preferably hardener, and barium sulphate having a primary particle size  $< 0.5 \mu\text{m}$ , in particular  $< 0.1 \mu\text{m}$ , and comprising crystallization inhibitor and a dispersant, the dispersant preferably being a polyether polycarboxylate substituted terminally on the polyether groups by hydroxyl groups.

15 13. Composition according to Claim 12, characterized in that the barium sulphate is present in an amount of 0.1% to 50% by weight, based on the total weight of the composition.

20 14. Composition comprising uncured epoxy resin and barium sulphate having a primary particle size  $< 0.5 \mu\text{m}$ , in particular  $< 0.1 \mu\text{m}$ , the barium sulphate comprising crystallization inhibitor and a dispersant, the dispersant preferably being a polyether polycarboxylate substituted terminally on the polyether groups by hydroxyl groups.

25 15. Composition according to Claim 14, characterized in that the barium sulphate is present in an amount of 0.1% to 50% by weight, based on the total weight of the composition.

30 16. Process for producing epoxy resins according to any one of Claims 1 to 9, characterized in that barium sulphate with a particle size  $< 0.5 \mu\text{m}$ , in particular  $< 0.1 \mu\text{m}$ , which comprises a crystallization inhibitor and a dispersant, the dispersant preferably being a polyether carboxylate substituted terminally on the polyether groups by hydroxyl groups, is deagglomerated in the precursor of

the cured epoxy resin, preferably in the hardener or in the uncured epoxy resin, and then the cured epoxy resin is produced.

17. Use of the composite material according to Claim 10 or 11 in watercraft construction, in wind turbines, pipes, containers, in vehicle construction or in aircraft construction.
- 5

**BEST AVAILABLE COPY**